MEETING MINUTES

RESTORATION ADVISORY BOARD
For
PLUM BROOK ORDNANCE WORKS
September 18, 2008

ATTENDEES

Rick Meadows, USACE Co-Chairperson
Patty Bertsch, USACE LRD
Lisa Humphreys, USACE Huntington
David Speer, RAB Member
Richard Pitsinger, RAB Member
Lee Yeckley, RAB Member
Gil Steinen, RAB Member
Lannae Long, USACE Nashville
Paul Jayko, OEPA NWDO
Archie Lunsey, OEPA NWDO
Bob Lallier, NASA
Steve Downey, Shaw Environmental
Mike Gunderson, Shaw Environmental
Tom Siard, Shaw Environmental
Helen Owens, Stillwater Environmental

Agenda
The agenda for the meeting included the following topics:

- Update on Current Actions / Investigations
- Overview of Work Under New Contract Awards
- Status of Proposed Plans / Decision Documents
- Pending Issues / Concerns
- Open Topics
- Schedule Next RAB Meeting

Update on Current Actions / Investigations

Pentolite Road Red Water Ponds (PRRWP) - Lisa Humphreys of USACE Huntington District provided an update on the composting activities at PRRWP. Ms. Humphreys reported that composting activities were completed and awaiting final laboratory results. Preliminary laboratory results indicated the TNT levels were below the RGO of 13.0 mg/L, and DNT levels were below 0.13 mg/L, with an average DNT of 0.004 mg/L. At these levels, the material can be disposed at Erie County Landfill. Ms. Humphreys informed the RAB that NASA wants the material for use on-site and she will be coordinating moving the material to the active NASA project areas.

Acid Areas 1, 2, 3 and Reservoir No. 2 Burning Ground - Lannae Long of USACE Nashville District provided an update on the activities and deliverables for Acid Areas 1, 2 and 3, and Reservoir No. 2 Burning Grounds. The presentation is included as part of these minutes.

Groundwater Feasibility Study - Tom Saird of Shaw Environmental provided an update of the Groundwater Feasibility Study. The presentation is included as part of these minutes.

Overview of Work Under New Contract Awards
Steve Downey of Shaw Environmental provided a review of the upcoming work under the new contracts. The presentation is included as part of these minutes.

Status of Proposed Plans / Decision Documents
Rick Meadows, PBOW Project Manager, USACE Huntington District provided an update on the Proposed Plan / Decision Document (PP/DD) for TNT Areas A, B, and C.

- The Proposed Plan (PP) is the initial document that outlines the path forward for the Area of Concern (AOC).
- The public will have 30 days to review and comment on the plan
- USACE must address each comment in a Responsiveness Summary
- The Decision Document (DD) is the legal document that governs the path forward on the project.

Mr. Meadows' presentation is included as part of these minutes.

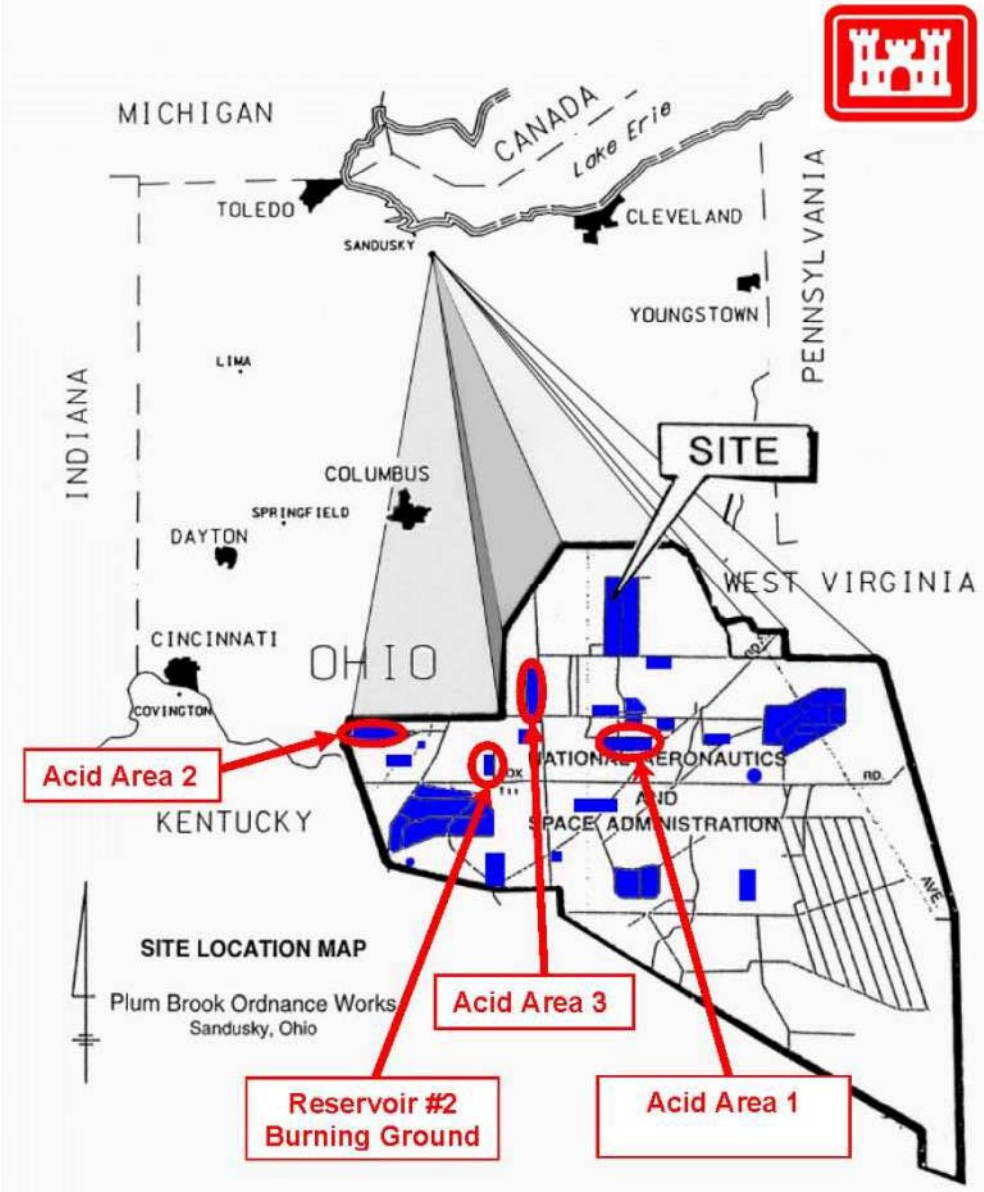
Future Property Use
Rick Meadows, PBOW Project Manager, USACE Huntington District, briefly reviewed the property use alternatives being considered by NASA and how the designated land use will impact USACE's clean up goals. Items presented included brief discussions of restricted and unrestricted land use and land use covenants.

Meeting Schedule
The proposed meeting dates were December 11 or 18, 2008.

Updates on
Reservoir #2 Burning Ground
and Acid Area 1
Acid Areas 2 and 3

Presentation to the
PBOW Restoration Advisory Board
By Lannae J Long
18 September 2008

PBOW Site Map

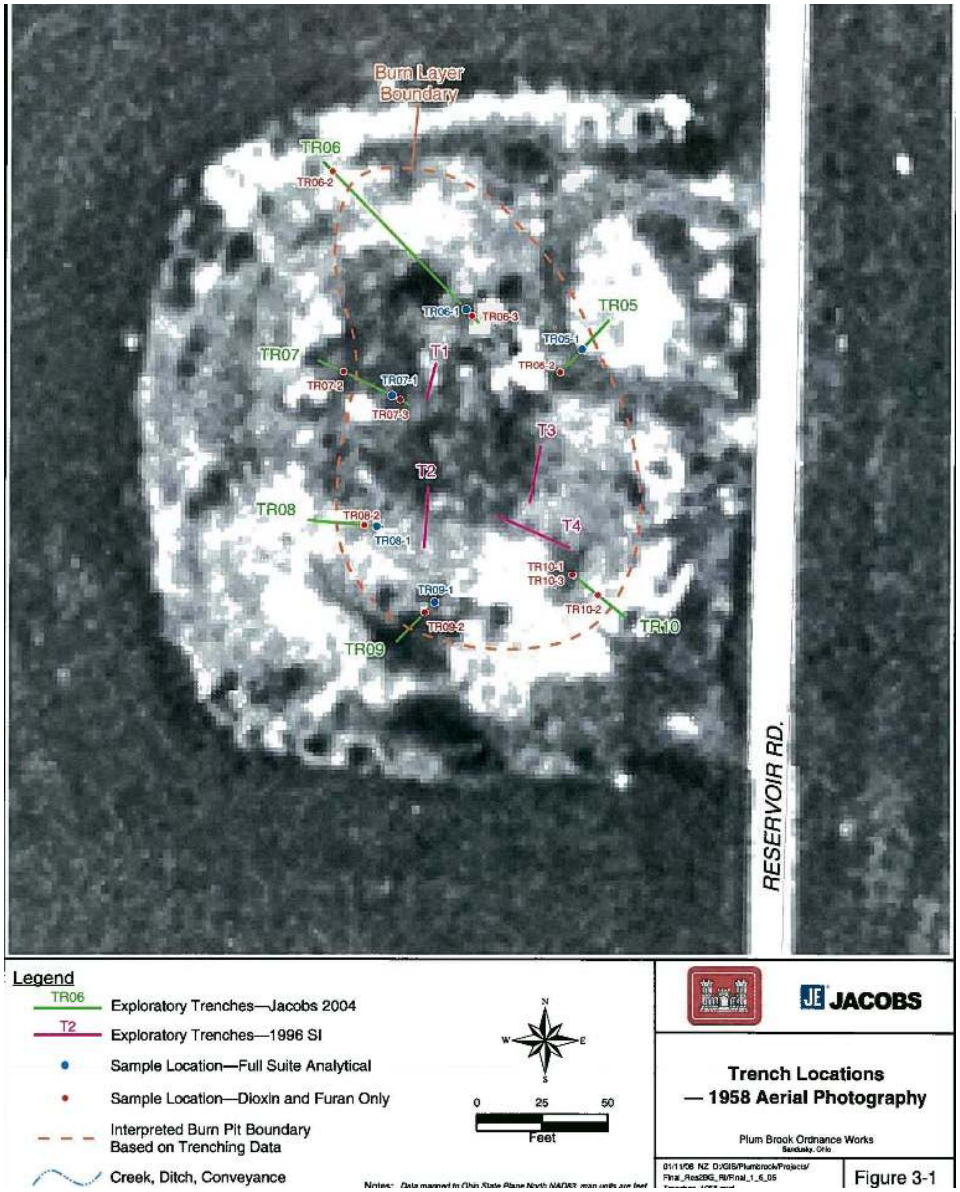


Reservoir #2 Burning Ground History

- Burned production process waste
- Historic photos show distinct burn area with conduit and debris
- SI 1996 found PAHs and PCBs
- RI Site Characterization Report 1 2006 found TNT, dioxins, PCBs, PAHs and lead

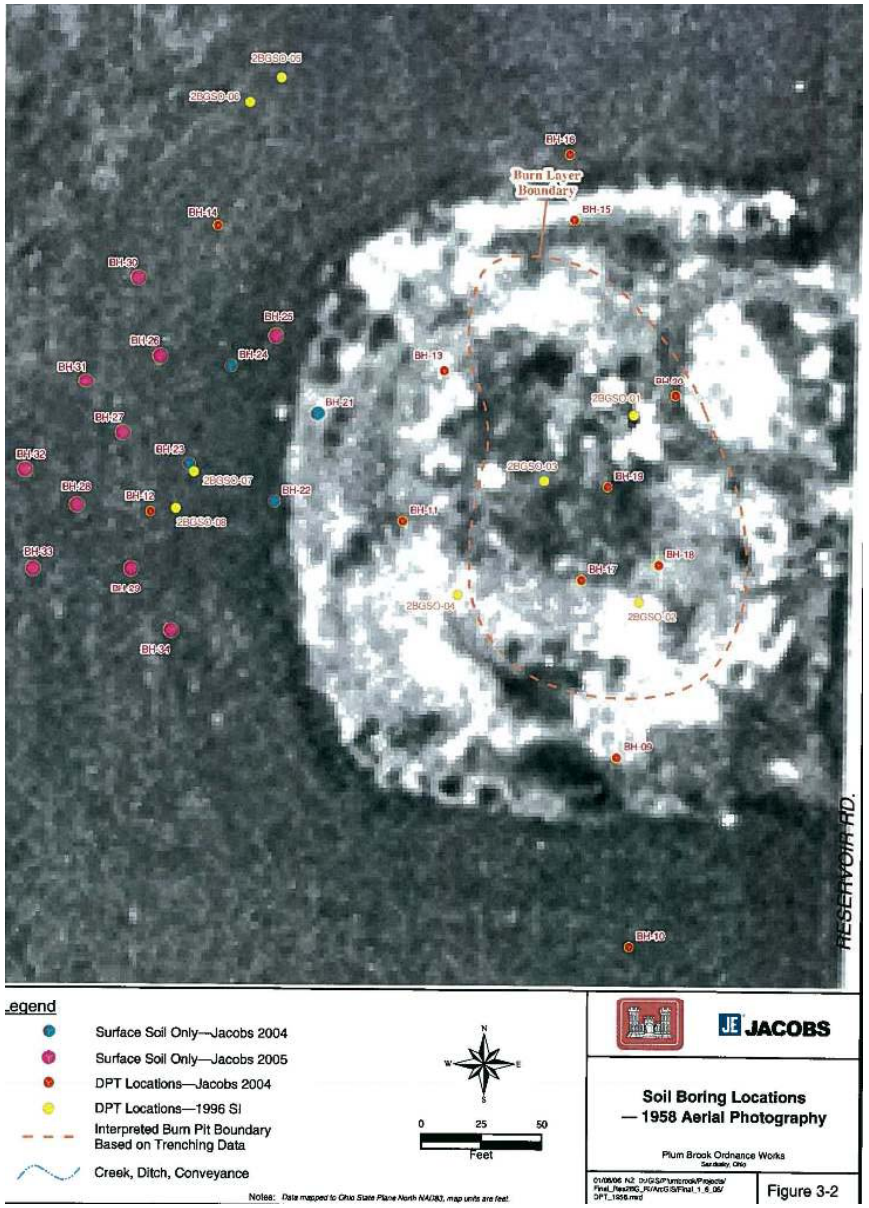
Reservoir #2 Burning Ground

- Soil trench locations in the burn area



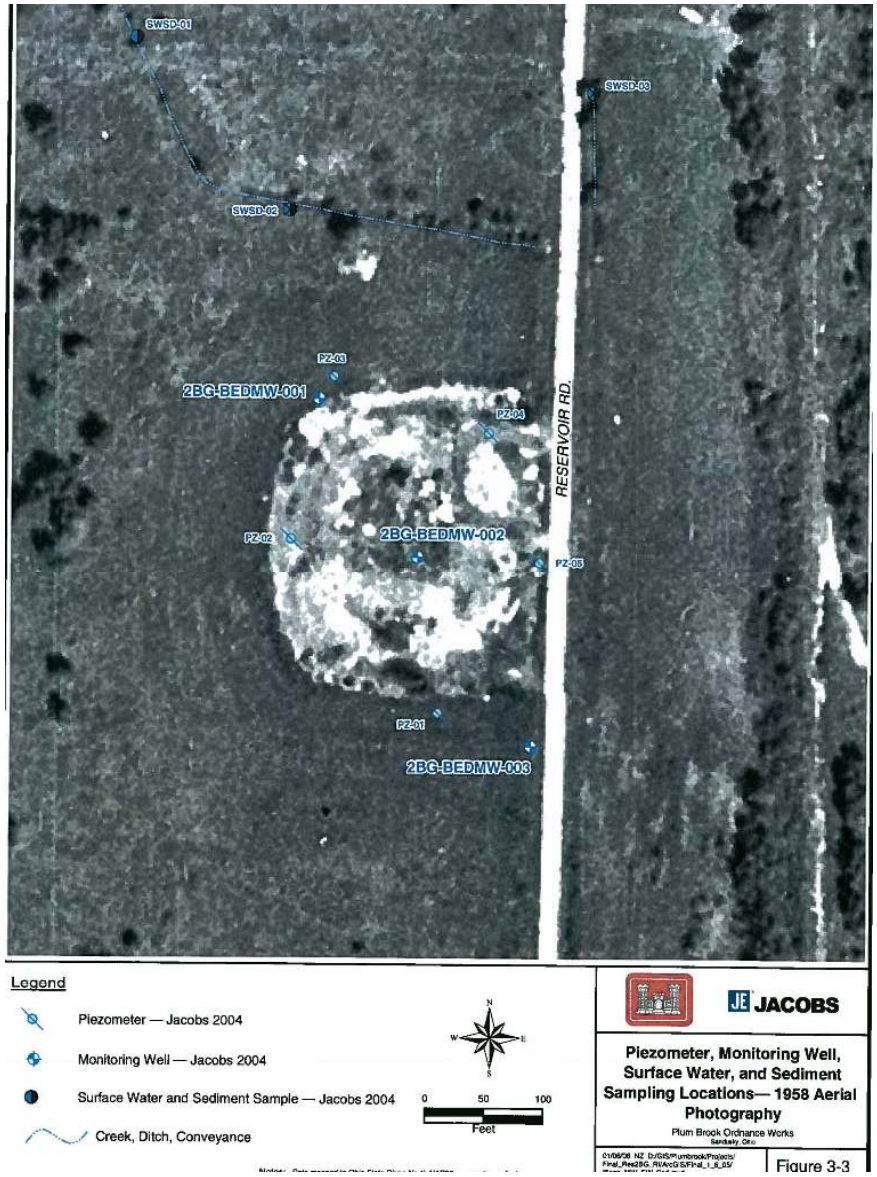
Reservoir #2 Burning Ground

- Soil boring and sample locations



Reservoir #2 Burning Ground

- Monitoring well, piezometers, surface water, and sediment sample locations



Reservoir #2 Burning Ground Schedule

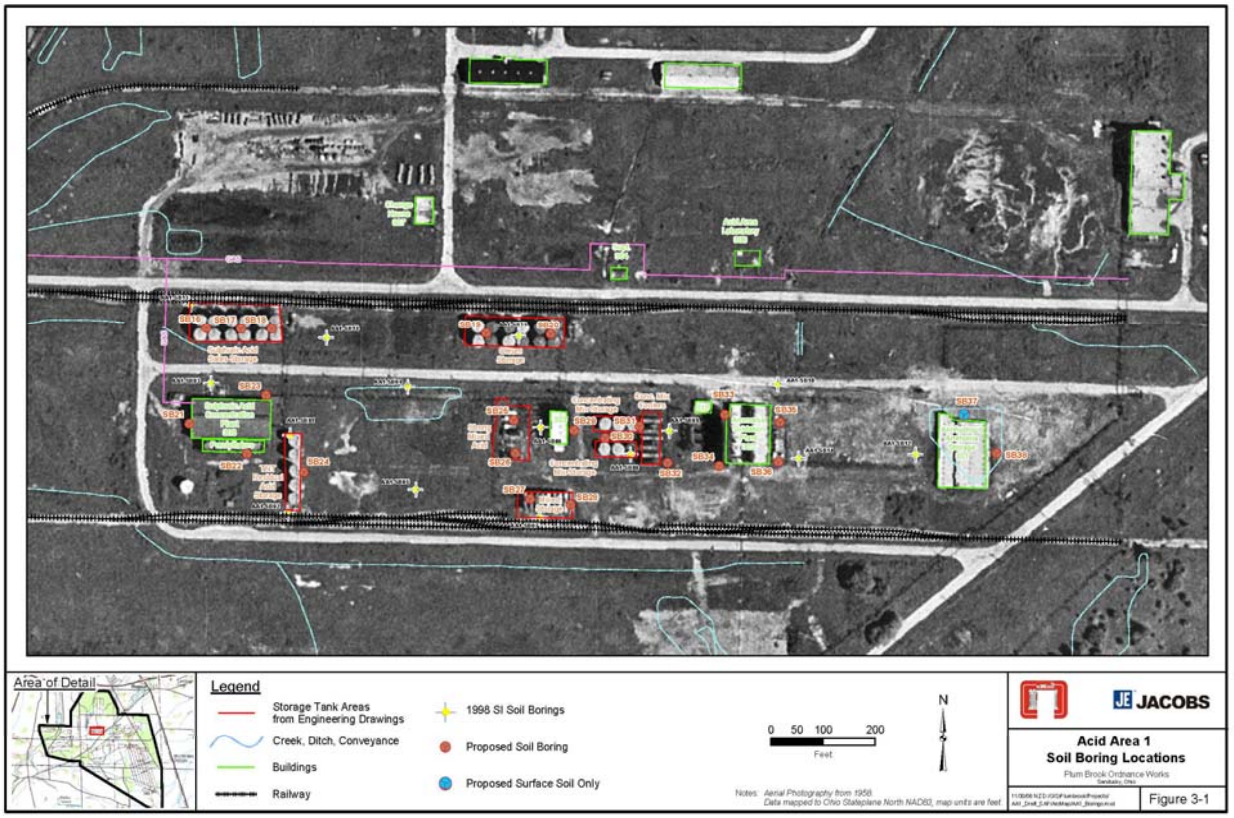
- Final Risk Assessment Work Plans sent on August 19, 2008
- Draft Risk Assessment Report due on December 15, 2008

Acid Area #1 History

- Production of Nitric and Sulfuric Acids Used in the Production of TNT.
- In Operation from 1941 to 1945
- Buildings dismantled between 1958 – 1968
- Site Investigation – 1998 (soil only)
- Elevated Levels of PCBs and PAHs in Soil

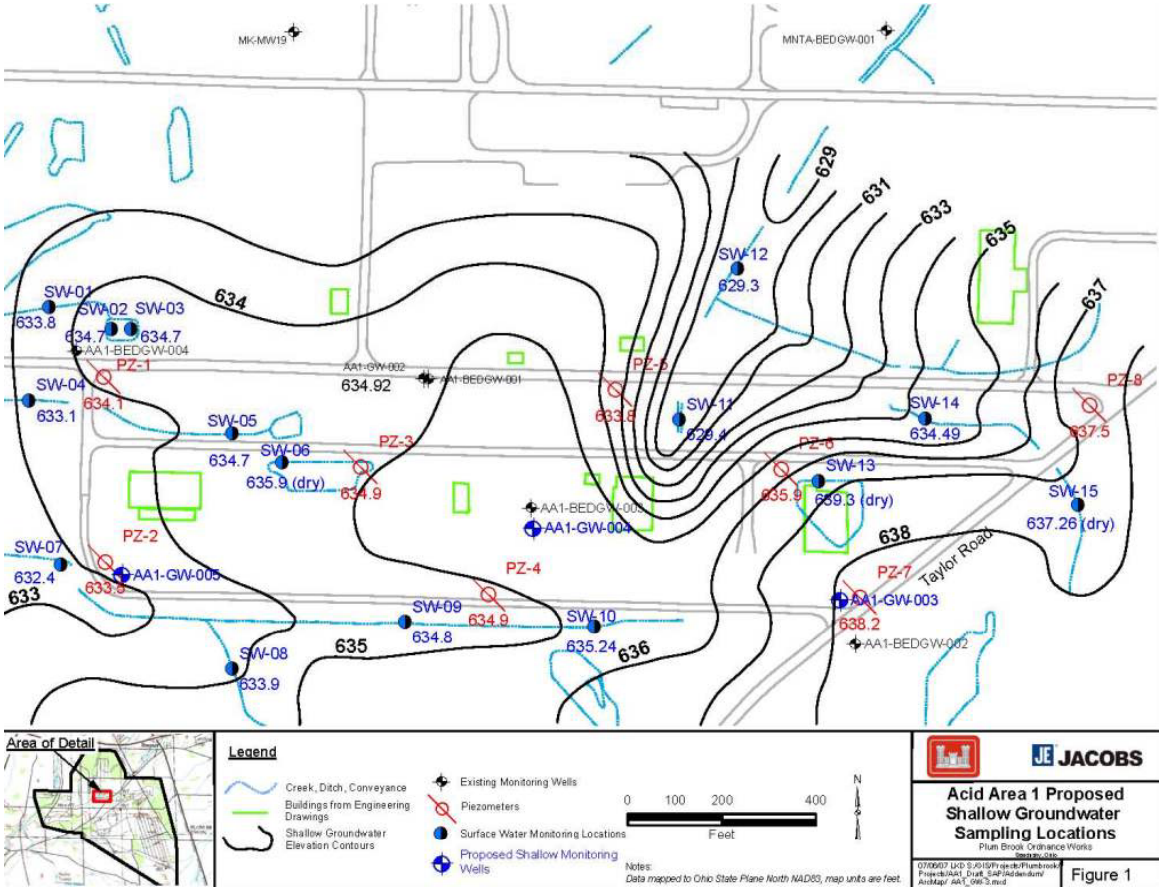
Acid Area #1

- Soil boring and sample locations



Acid Area #1

- Surface water, sediment, groundwater sampling locations



Acid Area #1
Schedule

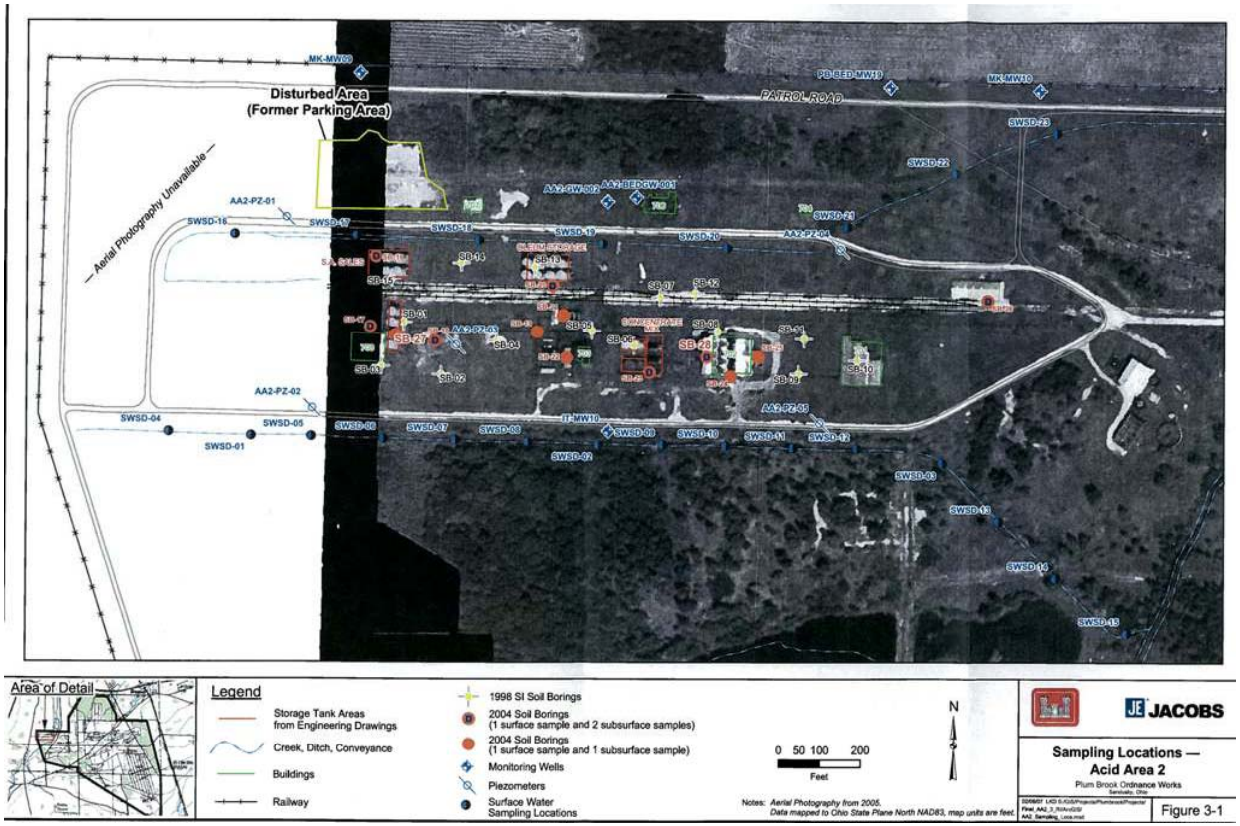
- Completed 2nd of 2 rounds GW sampling in May 2008
- Draft RI Site Characterization Report due October 15, 2008
- Draft Risk Assessment Work Plan October 2008
- Fall Eco Site Recon 1st week October

Acid Area #2 and #3 History

- SI 1998 PAHs, SVOCs, and PCBs
- RI 2007 PAHs, SVOCs, and PCBs
- Risk Assessment February 2008 PCBs at both Acid Areas

Acid Area #2

- Sample locations for soil, GW, SW and sediment



Acid Area #3

- Sample locations for soil, GW, SW and sediment

Acid Area #2 and #3 Schedule

- FS discussion memo
- Land use discussion
- Delineation sampling
- Draft FS February 2009 subject to change based on above outcome

Update of Groundwater Feasibility Study

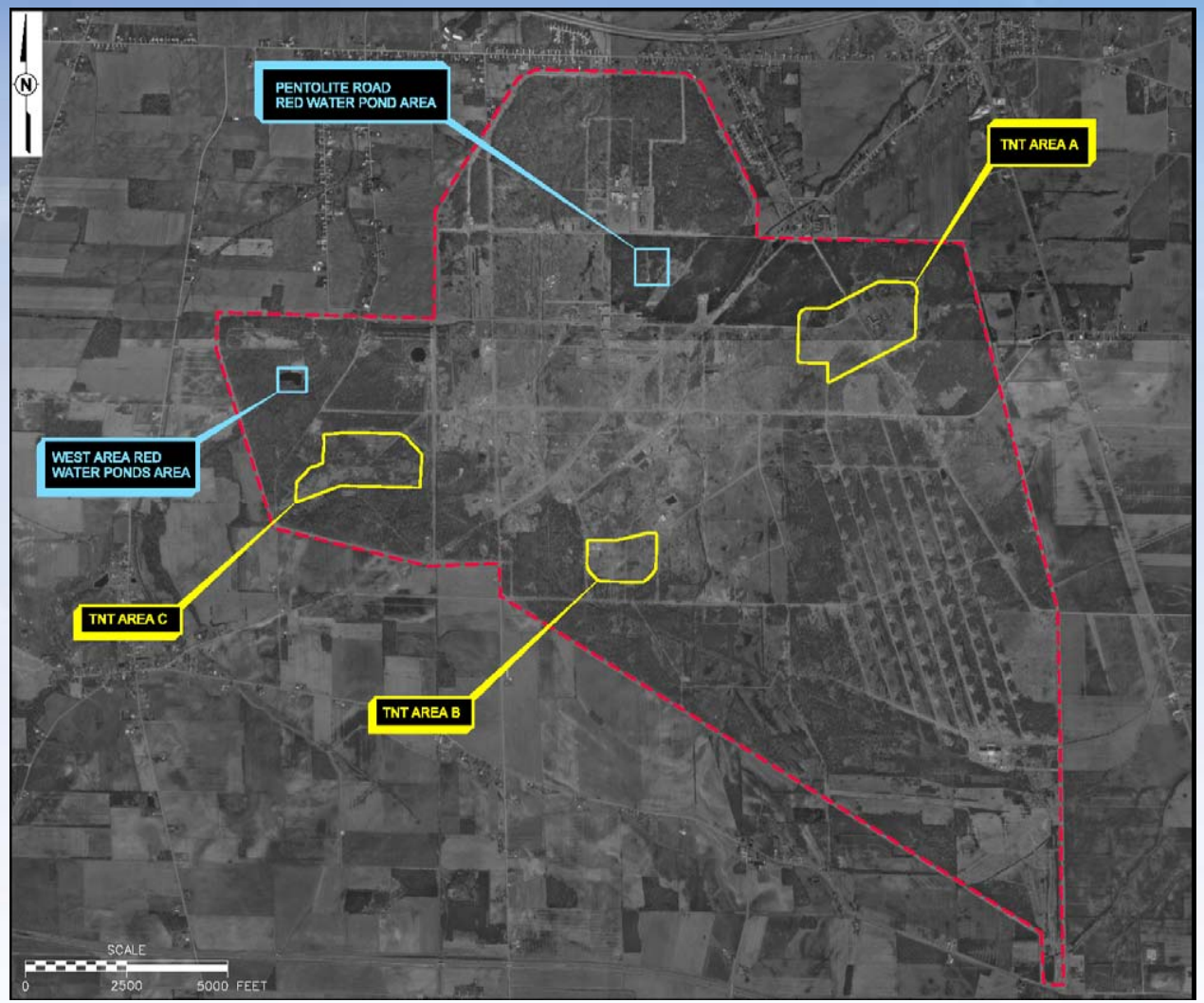
Tom Siard

Shaw E & I, Inc.

Areas Evaluated

- TNT Area A
- TNT Area B
- TNT Area C
- Pentolite Road Red Water Pond (PRRWP) Area
- West Area Red Water Ponds (WARWP) Area
- Downgradient Boundary

Site Locations



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Completed and Planned Source Removals

- **TNTB** – 12,156 CY removed (*completed 2006*)
- **PRRWP Area** – Approx. 8,000 CY removed (*completed 2008*)
- **TNTA** – Approx. 17,200 CY identified (*removal not yet performed*)
- **TNTC** – Approx. 9,200 CY identified (*removal not yet performed*)
- *Total estimate of 46,000 CY to be removed*

Site-Related Groundwater Contaminants

- 2,4,6-Trinitrotoluene (TNT)
- 2,4-Dinitrotoluene (2,4-DNT)
- 2,6-Dinitrotoluene (2,6-DNT)
- 2-Amino-4,6-dinitrotoluene (2ADNT)
- 4-Amino-2,6-dinitrotoluene (4ADNT)
- Several other “nitroaromatics” and related compounds
- Detections in the limestone groundwater have been sporadic

Ambient Groundwater Quality- Overburden/Shale

- Naturally elevated levels exceed SMCL or health advisory for:
  - Chloride (34,600 mg/L vs 250 mg/L)
  - Sulfate (416 mg/L vs 250 mg/L)
  - TDS (43,800 mg/L vs 500 mg/L)
  - Sodium (9,130 mg/L vs 20 mg/L)
- Natural petroleum is present regionally in the shale
- Undependable yield in areas investigated
- **Not potable water**

Ambient Groundwater Quality- Limestone

- Presence of naturally occurring petroleum at depth
  - petroleum visible on rock cores and drill bits (not at top of limestone)
  - free petroleum product in wells
  - presence of H_2S
- Naturally elevated levels of sulfate (1,340 mg/L) exceed the SMCL of 250 mg/L
- Unacceptable nonsite-related risk levels (metals, petroleum-related compounds)
- **Not potable water**

Contaminant Distribution in Groundwater

- Primarily locked up in overburden and weathered shale
- No evidence for contamination in deeper competent shale
- Groundwater contamination in limestone primarily occurs at locations where the shale is thin or absent (Red Water Pond Areas)

Potential for Natural Attenuation

- Movement of nitroaromatics appears to be impeded in shale unit, likely due to organic content in shale
- Observations of nondetects and low concentrations in limestone GW suggest that conditions in this unit are suitable for natural degradation of nitroaromatics
  - Low dissolved oxygen conditions
  - Low oxidation-reduction potential conditions
- **In summary, natural destruction of nitroaromatics in limestone unit is likely occurring**

Remedial Action Objectives (RAOs)

- The following RAOs have been developed for the FS based on residential exposure to drinking water:
  - Prevent on-site human exposure to groundwater containing COCs at concentrations that exceed Remedial Goals (RGs)
  - Prevent human exposure to downgradient off-site groundwater containing COCs at concentrations that exceed RGs

Evaluation of Remedial Alternatives

- The following 4 alternatives were selected for detailed evaluation:
  - GW-1: No further action (other than source removals)
  - GW-2: Groundwater monitoring and institutional controls (ICs) to prevent GW use
  - GW-3: ISEB/P&T for mitigation/protection of the limestone bedrock groundwater, monitoring, and ICs to prevent GW use
  - GW-4: ISEB/P&T for mitigation/protection of the overburden/shale and limestone bedrock groundwater, monitoring, and ICs to prevent GW use

Detailed Evaluation (cont'd)

- GW-2, GW-3, and GW-4 meet RAOs
- GW-1 currently meets RAOs, but meeting of RAOs may be uncertain in future

Groundwater Remedial Alternative Costs

- Alternative GW-1 – $0
- Alternative GW-2 – $1.3 to $2.9 M
- Alternative GW-3 – $11.0 to $23.5 M
- Alternative GW-4 – $13.6 to $29.1 M

(Above estimates reflect present worth costs)

Summary

- GW contamination locked up in overburden/shale
- Natural destruction is likely occurring in limestone unit
- Source removal prevents further contamination
- Not potable water based on ambient quality
- GW-2 meets RAOs for ~1/10 the cost of GW-3 and GW-4
- Final FS will be issued in October 2008

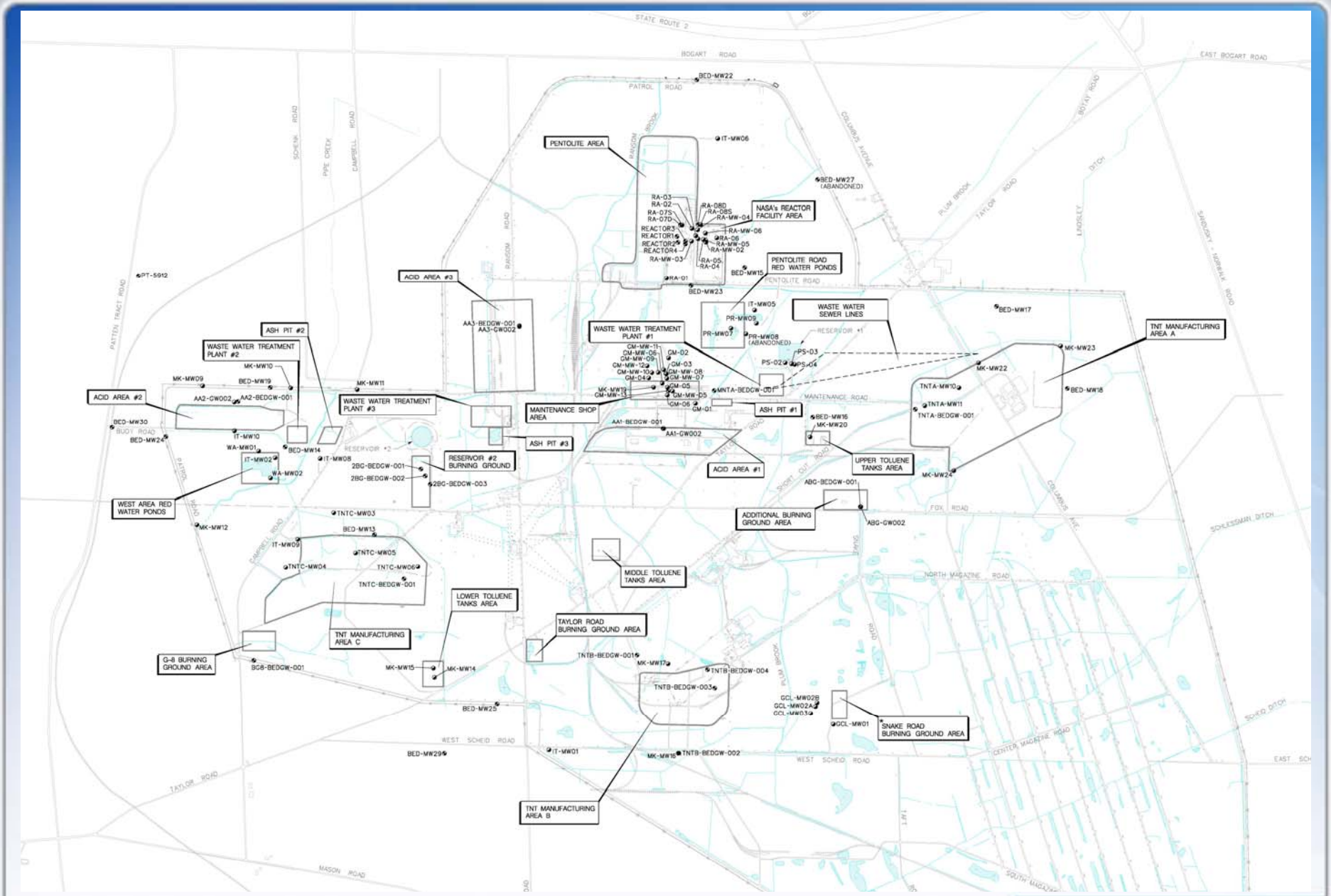
Overview of Work Under New Contract Awards

Steven T Downey, PE, PMP, LEED AP

Shaw E & I, Inc.

Agenda

- WWTP 1 Wooden Sewer Lines (awarded)
- WWTP 1 & 3 (awarded)
- Ash Pits 1 & 3 (awarded)
- Redwater Ponds (awarded)
- TNT A & C Pilot Study (awarded)
- Ash Pit 2 (pending)
- Garage Maintenance Area (awaiting funding)



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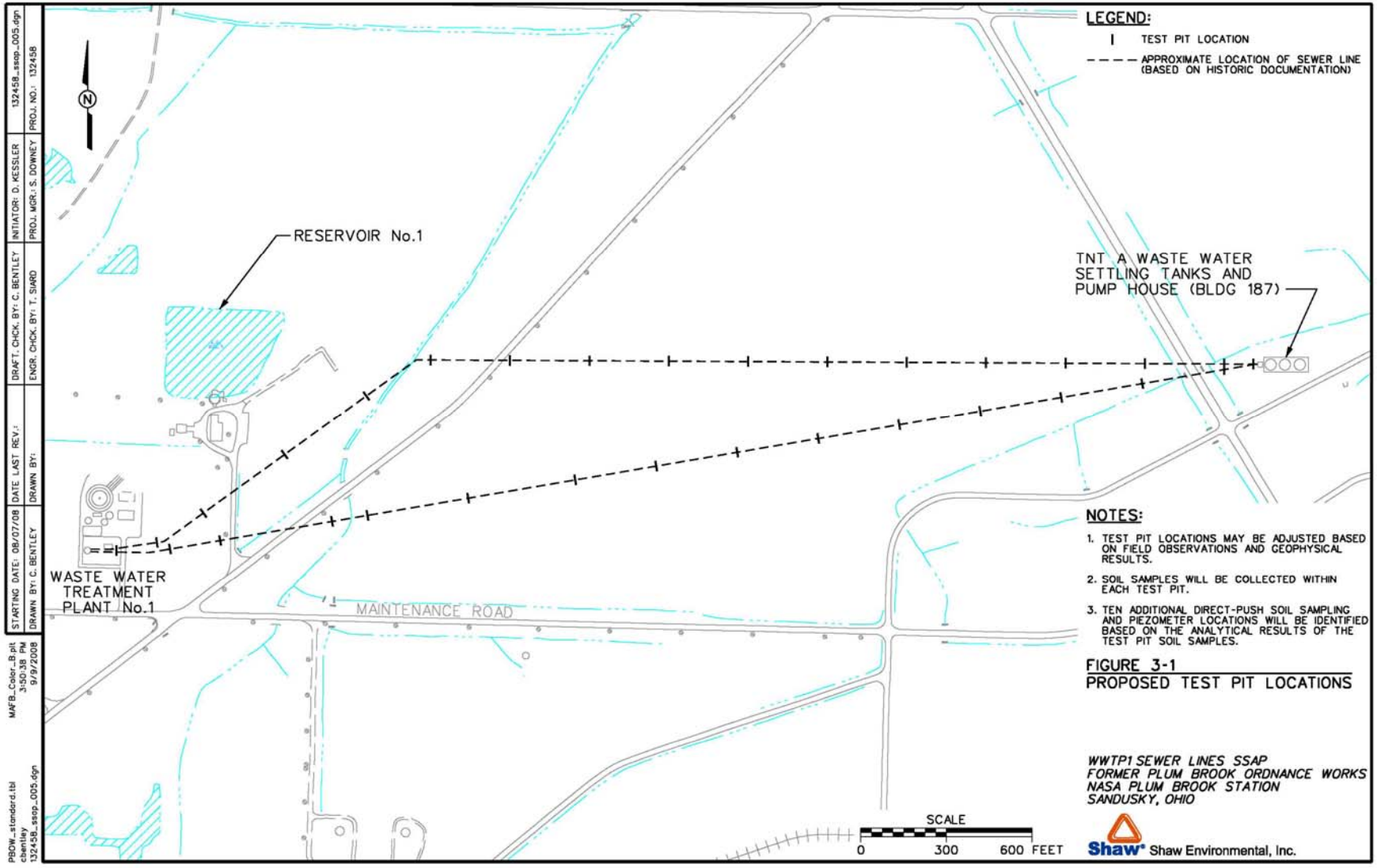
Shaw a world of Solutions

WWTP 1 Wooden Sewer Lines

- Site Investigation
  - Geophysical Survey
  - Trenching
  - Soil Borings & Piezometers
  - Wells (sampled Spring & Fall)
- Characterization Report
- BHHRA
- SLERA


LEGEND:
TEST PIT LOCATION
APPROXIMATE LOCATION OF SEWER LINE (BASED ON HISTORIC DOCUMENTATION)
RESERVOIR No.1
TNT A WASTE WATER SETTLING TANKS AND PUMP HOUSE (BLDG 187)
WASTE WATER TREATMENT PLANT No.1
MAINTENANCE ROAD
NOTES:
1. TEST PIT LOCATIONS MAY BE ADJUSTED BASED ON FIELD OBSERVATIONS AND GEOPHYSICAL RESULTS.
2. SOIL SAMPLES WILL BE COLLECTED WITHIN EACH TEST PIT.
3. TEN ADDITIONAL DIRECT-PUSH SOIL SAMPLING AND PIEZOMETER LOCATIONS WILL BE IDENTIFIED BASED ON THE ANALYTICAL RESULTS OF THE TEST PIT SOIL SAMPLES.
FIGURE 3-1
PROPOSED TEST PIT LOCATIONS
WWTP1 SEWER LINES SSAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
SCALE
0 300 600 FEET
Shaw Shaw Environmental, Inc.
STARTING DATE: 08/07/08
DRAWN BY: C. BENTLEY
DATE LAST REV.:
DRAWN BY:
DRAFT. CHCK. BY: C. BENTLEY
ENGR. CHCK. BY: T. SIARD
INITIATOR: D. KESSLER
PROJ. MGR.: S. DOWNEY
PROJ. NO.: 132458
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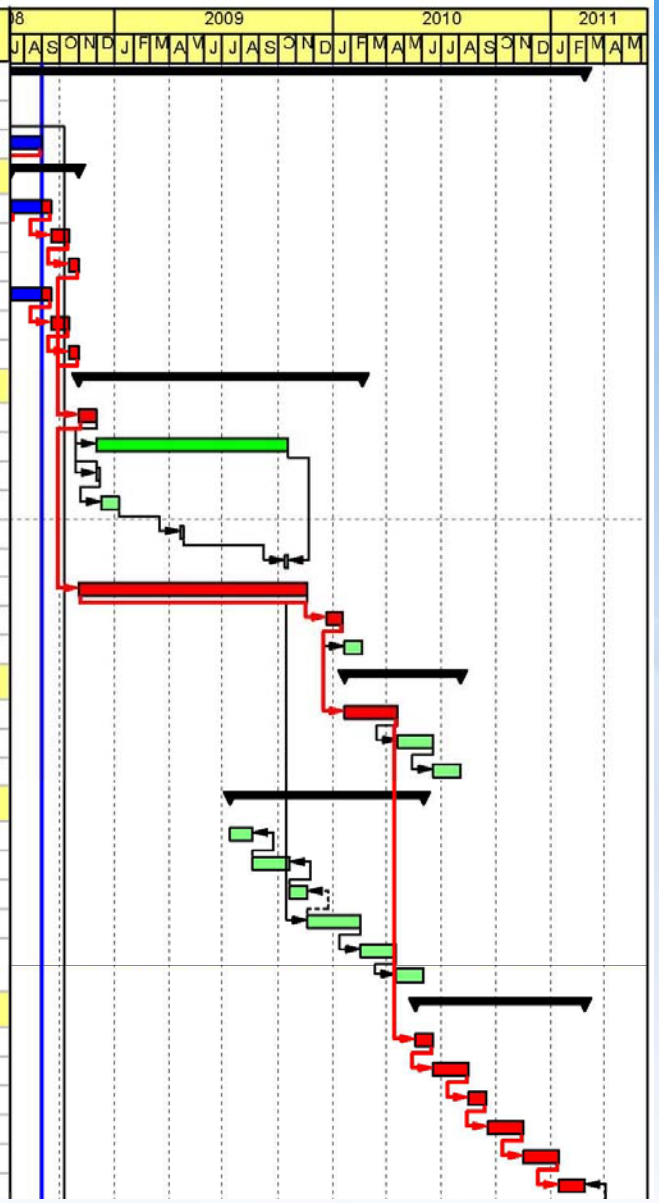
Activity ID	Activity Name	Remaining Duration	Start	Finish
WWSL RI		912	26-Jun-08 A	28-Feb-11
A1000	Task Order Award	0		26-Jun-08 A
A1010	Prepare & Submit QCP	1	27-Jun-08 A	31-Aug-08
Work Plans		61	11-Jul-08 A	31-Oct-08
A1020	Prepare & Submit Draft SSHP Addendum	16	11-Jul-08 A	16-Sep-08
A1030	Review SSHP Addendum	30	17-Sep-08	16-Oct-08
A1040	Prepare & Submit Final SSHP Addendum	15	17-Oct-08	31-Oct-08
A1050	Prepare & Submit Draft SSAP Addendum	16	11-Jul-08 A	16-Sep-08
A1060	Review SSAP Addendum	30	17-Sep-08	16-Oct-08
A1070	Prepare & Submit Final SSAP Addendum	15	17-Oct-08	31-Oct-08
Field Work		475	01-Nov-08	18-Feb-10
A1090	Soil Remedial Investigation	30	01-Nov-08	30-Nov-08
A1100	GW Remedial Investigation	322	01-Dec-08	18-Oct-09
A1101	Install & Sample Piezometers	7	01-Dec-08	07-Dec-08
A1102	Install Wells	30	08-Dec-08	06-Jan-09
A1103	Sample Wells - Round #1	7	20-Apr-09	26-Apr-09
A1104	Sample Wells - Round #2	7	12-Oct-09	18-Oct-09
A1120	Analytical	383	01-Nov-08	18-Nov-09
A1130	IDW	30	21-Dec-09	19-Jan-10
A1140	GIS	30	20-Jan-10	18-Feb-10
Site Characterization Report		195	20-Jan-10	02-Aug-10
A1150	Prepare & Submit Draft Site Characterization Report	90	20-Jan-10	19-Apr-10
A1160	Review Draft Site Characterization Report	60	20-Apr-10	18-Jun-10
A1170	Prepare & Submit Final Site Characterization Report	45	19-Jun-10	02-Aug-10
Baseline Human Health Risk Assessment		325	12-Jul-09	01-Jun-10
A1172	Prepare & Submit Draft HHRA Work Plan	40	12-Jul-09	21-Aug-09
A1174	Review HHRA Work Plan	60	21-Aug-09	20-Oct-09
A1176	Prepare & Submit Final HHRA Work Plan	30	20-Oct-09	19-Nov-09
A1180	Prepare & Submit Draft HHRA Report	90	19-Nov-09	16-Feb-10
A1190	Review HHRA Report	60	17-Feb-10	17-Apr-10
A1200	Prepare & Submit Final HHRA Report	45	18-Apr-10	01-Jun-10
Ecological Risk Assessment		285	20-May-10	28-Feb-11
A1210	Prepare & Submit Draft Ecological RA Work Plan	30	20-May-10	18-Jun-10
A1220	Review Draft Ecological RA Work Plan	60	19-Jun-10	17-Aug-10
A1230	Prepare & Submit Final Ecological RA Work Plan	30	18-Aug-10	16-Sep-10
A1330	Prepare & Submit Draft Ecological RA Report	60	17-Sep-10	15-Nov-10
A1340	Review Draft Ecological RA Report	60	16-Nov-10	14-Jan-11
A1350	Prepare & Submit Final Ecological RA Report	45	15-Jan-11	28-Feb-11



Waste Water Treatment Plant 1 & 3

- Update Site-Wide HSP and SAP
- Site Investigation
  - Soil Borings & Piezometers
  - Wells (sampled Spring & Fall)
- Characterization Report
- BHHRA
- SLERA

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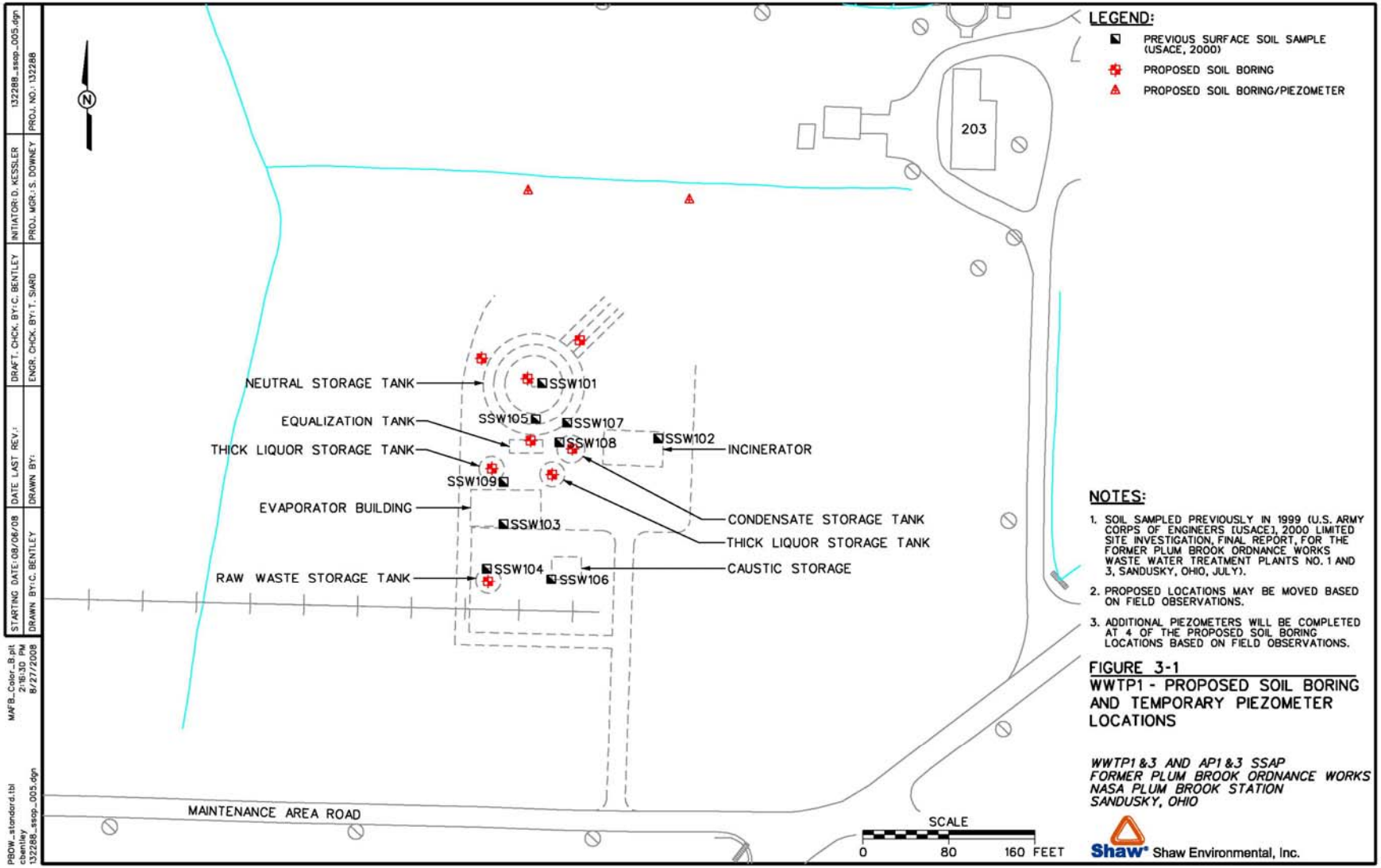
LEGEND:
PREVIOUS SURFACE SOIL SAMPLE (USACE, 2000)
PROPOSED SOIL BORING
PROPOSED SOIL BORING/PIEZOMETER
203
NEUTRAL STORAGE TANK
SSW101
EQUALIZATION TANK
SSW105
SSW107
THICK LIQUOR STORAGE TANK
SSW108
SSW102
INCINERATOR
SSW109
EVAPORATOR BUILDING
SSW103
CONDENSATE STORAGE TANK
THICK LIQUOR STORAGE TANK
RAW WASTE STORAGE TANK
SSW104
SSW106
CAUSTIC STORAGE
MAINTENANCE AREA ROAD
SCALE
0
80
160 FEET
NOTES:
1. SOIL SAMPLED PREVIOUSLY IN 1999 (U.S. ARMY CORPS OF ENGINEERS (USACE), 2000 LIMITED SITE INVESTIGATION, FINAL REPORT, FOR THE FORMER PLUM BROOK ORDNANCE WORKS WASTE WATER TREATMENT PLANTS NO. 1 AND 3, SANDUSKY, OHIO, JULY).
2. PROPOSED LOCATIONS MAY BE MOVED BASED ON FIELD OBSERVATIONS.
3. ADDITIONAL PIEZOMETERS WILL BE COMPLETED AT 4 OF THE PROPOSED SOIL BORING LOCATIONS BASED ON FIELD OBSERVATIONS.
FIGURE 3-1
WWTP1 - PROPOSED SOIL BORING AND TEMPORARY PIEZOMETER LOCATIONS
WWTP1 &3 AND AP1 &3 SSAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
Shaw Shaw Environmental, Inc.
STARTING DATE: 08/06/08
DRAWN BY: C. BENTLEY
DATE LAST REV.:
DRAWN BY:
DRAFT. CHCK. BY: C. BENTLEY
ENGR. CHCK. BY: T. SIARD
INITIATOR: D. KESSLER
PROJ. MGR.: S. DOWNEY
PROJ. NO.: 132288
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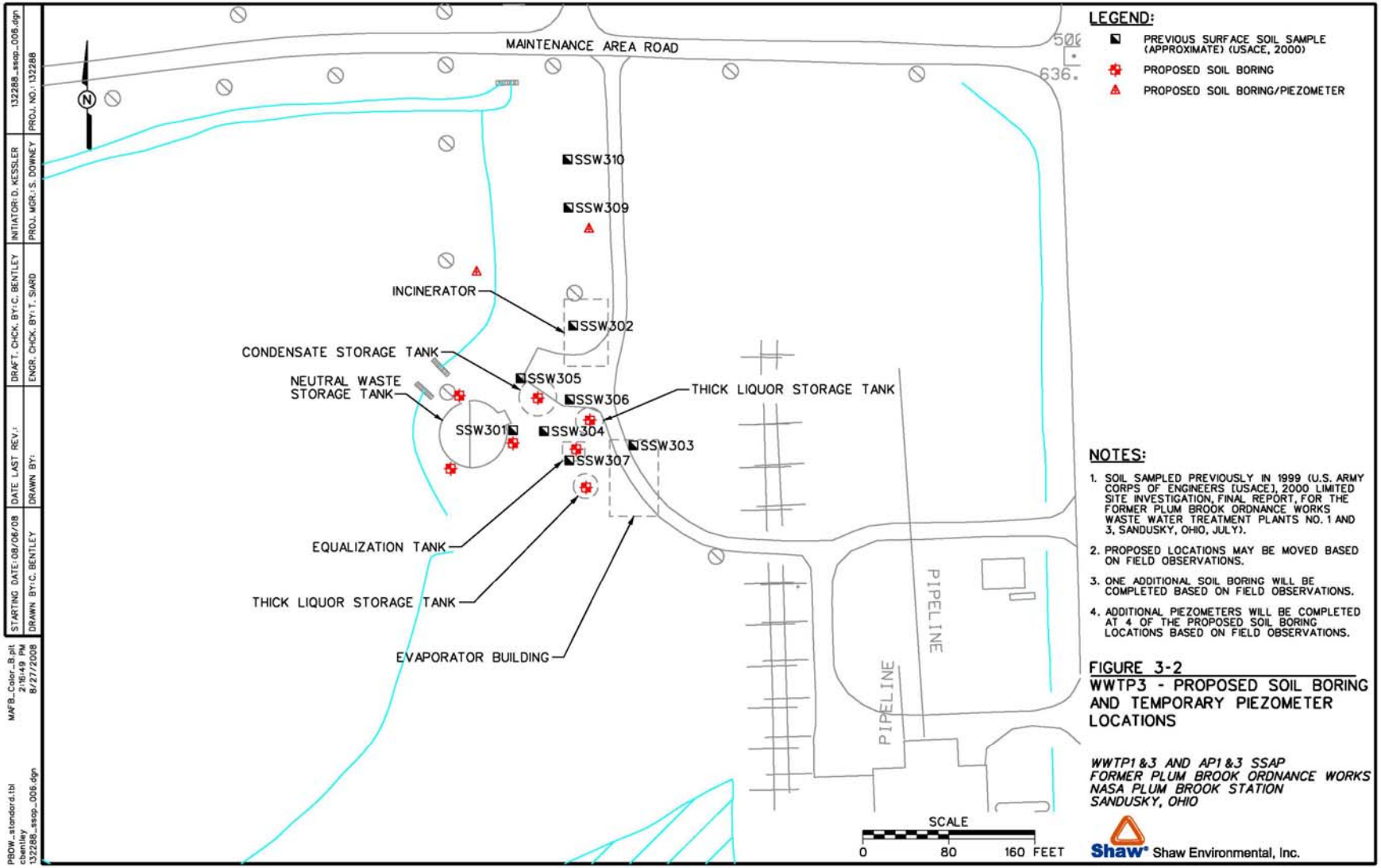

FIGURE 3-2
WWTP3 - PROPOSED SOIL BORING AND TEMPORARY PIEZOMETER LOCATIONS

WWTP1 &3 AND AP1 &3 SSAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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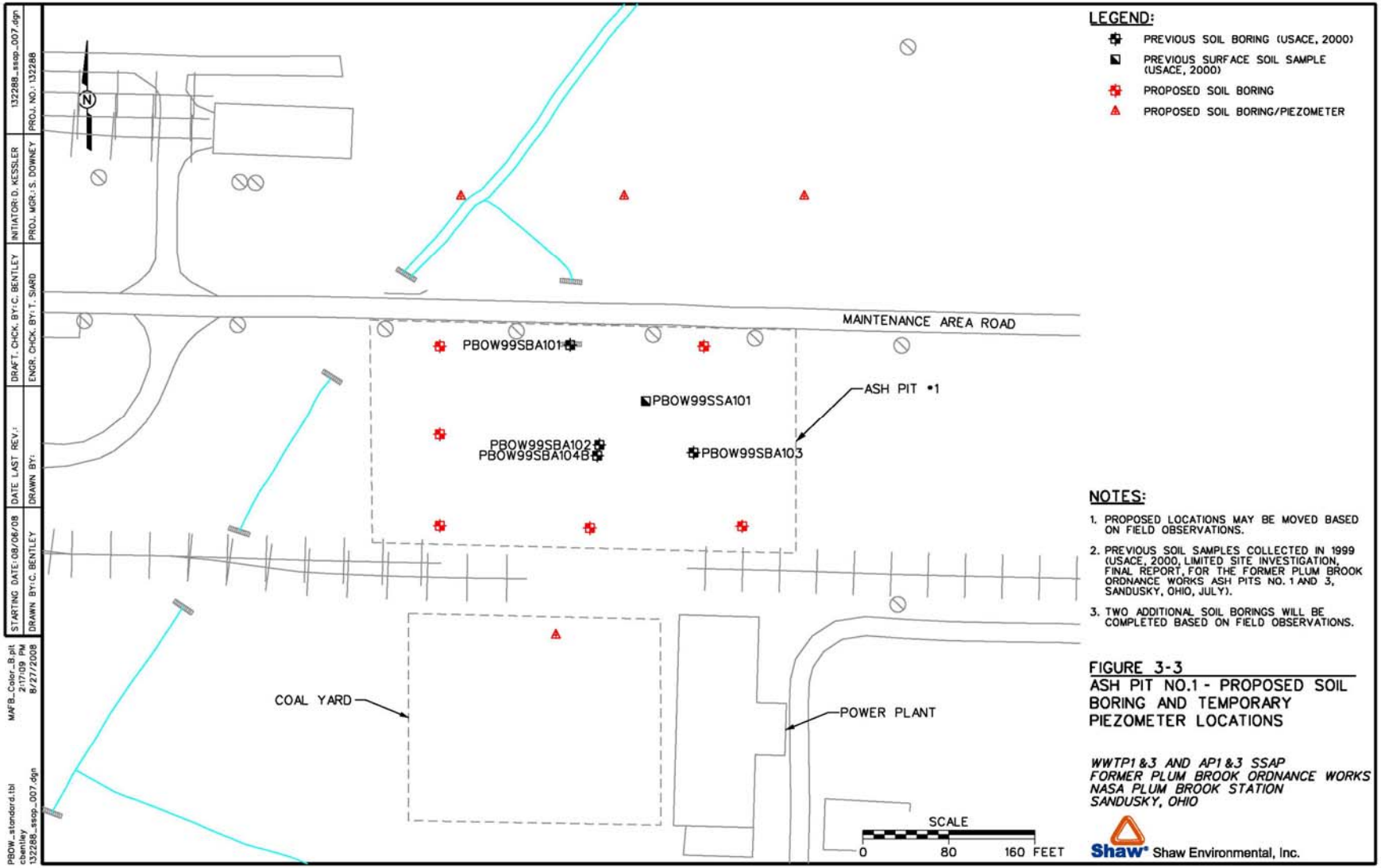
Ash Pits 1 & 3

- Site Investigation
  - Soil Borings & Piezometers
  - Wells (sampled Spring & Fall)
- Characterization Report
- BHHRA
- SLERA


LEGEND:
PREVIOUS SOIL BORING (USACE, 2000)
PREVIOUS SURFACE SOIL SAMPLE (USACE, 2000)
PROPOSED SOIL BORING
PROPOSED SOIL BORING/PIEZOMETER
MAINTENANCE AREA ROAD
PBOW99SBA101
PBOW99SSA101
ASH PIT #1
PBOW99SBA102
PBOW99SBA104B
PBOW99SBA103
COAL YARD
POWER PLANT
SCALE
0
80
160 FEET
NOTES:
1. PROPOSED LOCATIONS MAY BE MOVED BASED ON FIELD OBSERVATIONS.
2. PREVIOUS SOIL SAMPLES COLLECTED IN 1999 (USACE, 2000, LIMITED SITE INVESTIGATION, FINAL REPORT, FOR THE FORMER PLUM BROOK ORDNANCE WORKS ASH PITS NO. 1 AND 3, SANDUSKY, OHIO, JULY).
3. TWO ADDITIONAL SOIL BORINGS WILL BE COMPLETED BASED ON FIELD OBSERVATIONS.
FIGURE 3-3
ASH PIT NO.1 - PROPOSED SOIL BORING AND TEMPORARY PIEZOMETER LOCATIONS
WWTP1 &3 AND AP1 &3 SSAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
Shaw Shaw Environmental, Inc.
STARTING DATE: 08/06/08
DRAWN BY: C. BENTLEY
DATE LAST REV.:
DRAWN BY:
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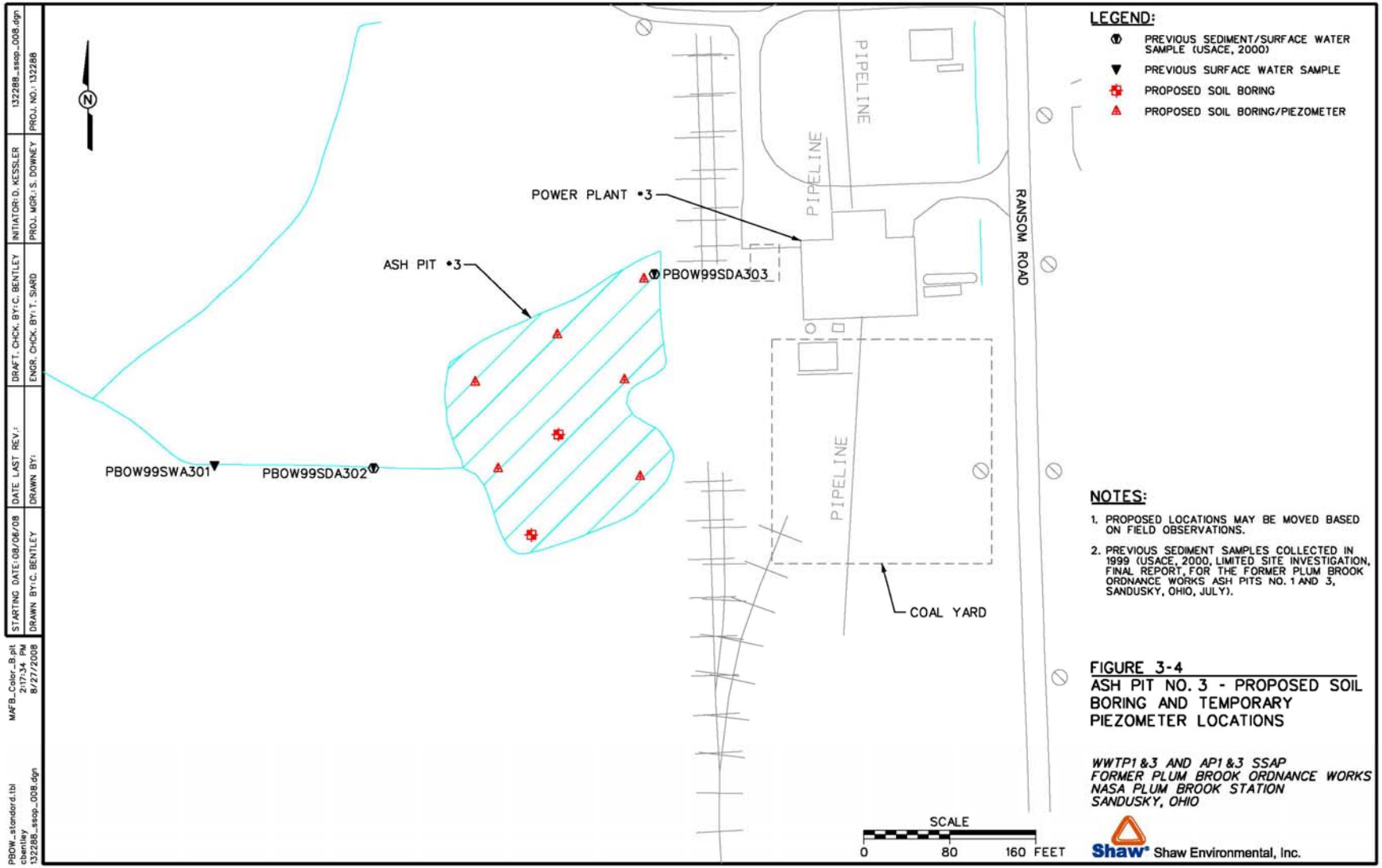
LEGEND:
PREVIOUS SEDIMENT/SURFACE WATER SAMPLE (USACE, 2000)
PREVIOUS SURFACE WATER SAMPLE
PROPOSED SOIL BORING
PROPOSED SOIL BORING/PIEZOMETER
POWER PLANT #3
ASH PIT #3
PBOW99SDA303
PBOW99SWA301
PBOW99SDA302
PIPELINE
PIPELINE
PIPELINE
RANSOM ROAD
COAL YARD
SCALE
0
80
160 FEET
NOTES:
1. PROPOSED LOCATIONS MAY BE MOVED BASED ON FIELD OBSERVATIONS.
2. PREVIOUS SEDIMENT SAMPLES COLLECTED IN 1999 (USACE, 2000, LIMITED SITE INVESTIGATION, FINAL REPORT, FOR THE FORMER PLUM BROOK ORDNANCE WORKS ASH PITS NO. 1 AND 3, SANDUSKY, OHIO, JULY).
FIGURE 3-4
ASH PIT NO. 3 - PROPOSED SOIL BORING AND TEMPORARY PIEZOMETER LOCATIONS
WWTP1 &3 AND AP1 &3 SSAP
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO
Shaw Shaw Environmental, Inc.
STARTING DATE: 08/06/08
DRAWN BY: C. BENTLEY
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DRAWN BY:
DRAFT. CHCK. BY: C. BENTLEY
ENGR. CHCK. BY: T. SIARD
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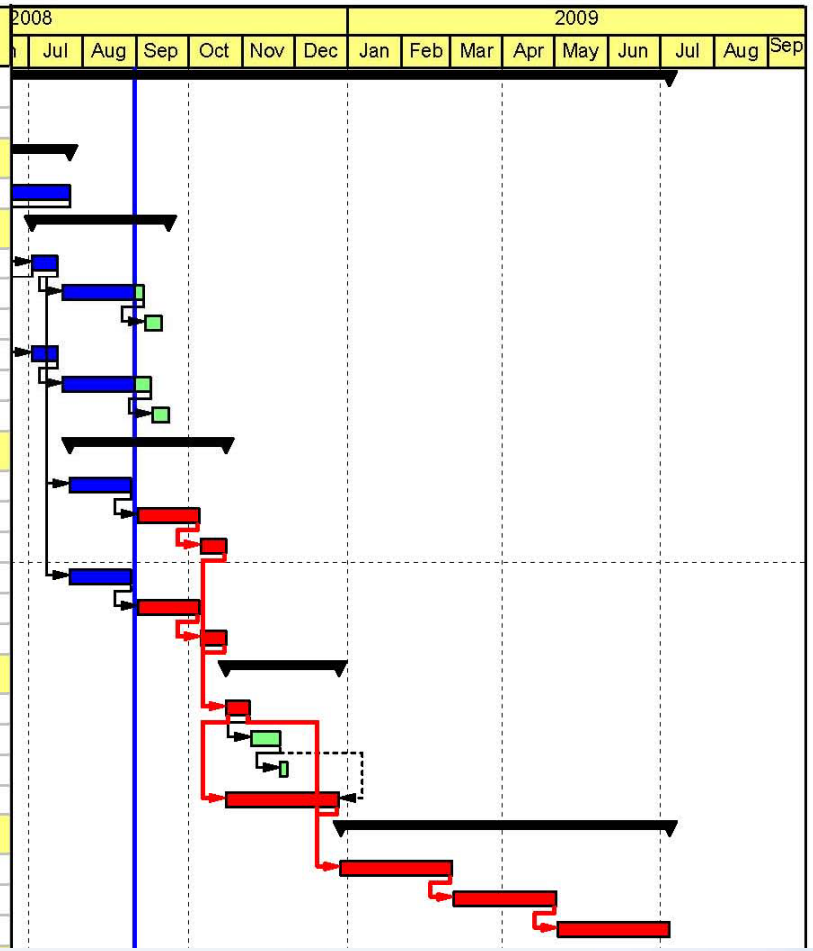
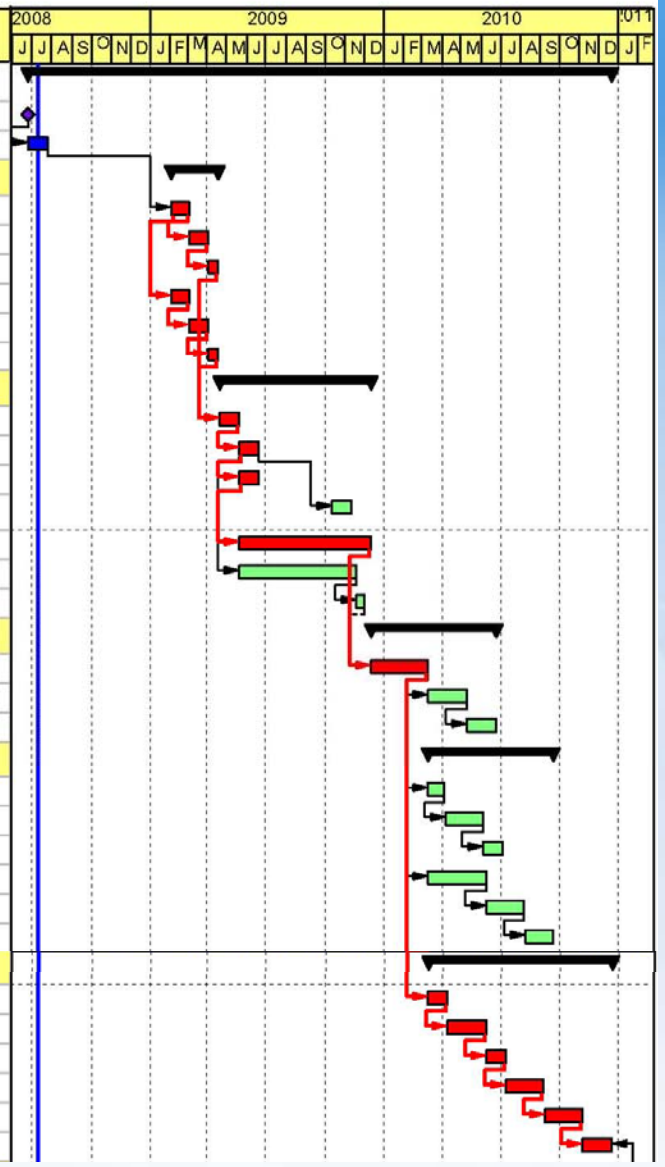
Activity ID	Activity Name	Remaining Duration	Start	Finish
RI Part I, Waste Water Treatment Plants ...		309	11-Jun-08 A	05-Jul-09
A1060	Notice To Proceed	0	11-Jun-08 A	
QCP		0	16-Jun-08 A	25-Jul-08 A
A1000	QCP	0	16-Jun-08 A	25-Jul-08 A
Site-Wide Plans		20	03-Jul-08 A	19-Sep-08
A1020	Prepare & Submit Draft Site-Wide SHP	0	03-Jul-08 A	18-Jul-08 A
A1030	Review Site-Wide SHP	6	21-Jul-08 A	05-Sep-08
A1040	Prepare & Submit Final Site-Wide SHP	10	06-Sep-08	15-Sep-08
A1050	Prepare & Submit Draft Site-Wide SAP	0	03-Jul-08 A	18-Jul-08 A
A1070	Review Site-Wide SAP	10	21-Jul-08 A	09-Sep-08
A1080	Prepare & Submit Final Site-Wide SAP	10	10-Sep-08	19-Sep-08
SSHP & SSAP Addenda		51	25-Jul-08 A	22-Oct-08
A1090	Prepare Draft SSHP	0	25-Jul-08 A	29-Aug-08 A
A1100	External Review Draft SSHP	36	02-Sep-08	07-Oct-08
A1110	Prepare & Submit Final SSHP	15	08-Oct-08	22-Oct-08
A1120	Prepare Draft SSAP Addenda	0	25-Jul-08 A	29-Aug-08 A
A1130	External Review Draft SSAP Addenda	36	02-Sep-08	07-Oct-08
A1140	Prepare & Submit Final SSAP Addenda	15	08-Oct-08	22-Oct-08
Field Work & Sample Analysis		66	23-Oct-08	27-Dec-08
A1150	Soil Remedial Investigation	14	23-Oct-08	05-Nov-08
A1160	GW Piezometer Remedial Investigation	17	06-Nov-08	22-Nov-08
A1170	Investigation Derived Waste	5	23-Nov-08	27-Nov-08
A1171	Analytical	66	23-Oct-08	27-Dec-08
Interim Data Deliverable Report		190	28-Dec-08	05-Jul-09
A1200	Prepare Draft Report	65	28-Dec-08	02-Mar-09
A1210	External Review Draft Report	60	03-Mar-09	01-May-09
A1220	Prepare & Submit Final Report	65	02-May-09	05-Jul-09



Activity ID	Activity Name	Remaining Duration	Start	Finish
WWTP 1 & 3, AP 1&3 Phase II GW RI, BHHRA, ...		894	26-Jun-08 A	20-Dec-10
A1010	Task Order Award	0	26-Jun-08 A	
A1020	QCP	0	26-Jun-08 A	24-Jul-08 A
Work Plans		75	02-Feb-09	17-Apr-09
A1000	Prepare & Submit Draft SSHP Addendum	29	02-Feb-09	02-Mar-09
A1030	Review Draft SSHP Addendum	30	03-Mar-09	01-Apr-09
A1040	Prepare & Submit Final SSHP Addendum	16	02-Apr-09	17-Apr-09
A1050	Prepare & Submit Draft SSAP Addendum	29	02-Feb-09	02-Mar-09
A1060	Review Draft SSAP Addendum	30	03-Mar-09	01-Apr-09
A1070	Prepare & Submit Final SSAP Addendum	16	02-Apr-09	17-Apr-09
Field Work		235	20-Apr-09	10-Dec-09
A1080	Monitoring Well Installation & Development	30	20-Apr-09	19-May-09
A1090	GW Sampling 1st Round	30	20-May-09	18-Jun-09
A1100	Surface Water & Sediment Sampling	30	20-May-09	18-Jun-09
A1105	GW Sampling 2nd Round	30	12-Oct-09	10-Nov-09
A1110	Analytical	205	20-May-09	10-Dec-09
A1120	IDW	182	20-May-09	17-Nov-09
A1130	GIS	15	18-Nov-09	02-Dec-09
Site Characterization Report		195	11-Dec-09	23-Jun-10
A1140	Prepare & Submit Draft Site Characterization Report	90	11-Dec-09	10-Mar-10
A1150	Review Draft Site Characterization Report	60	11-Mar-10	09-May-10
A1160	Prepare & Submit Final Site Characterization Report	45	10-May-10	23-Jun-10
Baseline Human Health Risk Assessment		195	11-Mar-10	21-Sep-10
A1162	Prepare & Submit Draft BLHHRA Work Plan	26	11-Mar-10	05-Apr-10
A1164	Review Draft BLHHRA Work Plan	60	06-Apr-10	04-Jun-10
A1166	Prepare & Submit Final BLHHRA Work Plan	30	05-Jun-10	04-Jul-10
A1170	Prepare & Submit Draft BLHHRA	90	11-Mar-10	08-Jun-10
A1180	Review Draft BLHHRA	60	09-Jun-10	07-Aug-10
A1190	Prepare & Submit Final BLHHRA	45	08-Aug-10	21-Sep-10
Screening Level Ecological Risk Assessment		285	11-Mar-10	20-Dec-10
A1200	Prepare & Submit Draft Ecological RA Work Plan	30	11-Mar-10	09-Apr-10
A1210	Review Draft Ecological RA Work Plan	60	10-Apr-10	08-Jun-10
A1220	Prepare & Submit Final Ecological RA Work Plan	30	09-Jun-10	08-Jul-10
A1250	Prepare & Submit Draft Ecological RA Report	60	09-Jul-10	06-Sep-10
A1260	Review Draft Ecological RA Report	60	07-Sep-10	05-Nov-10
A1270	Prepare & Submit Final Ecological RA Report	45	06-Nov-10	20-Dec-10



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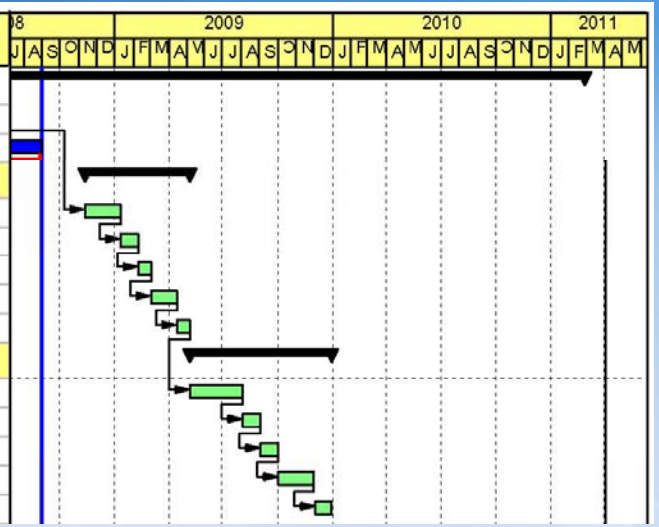
Red Water Ponds Groundwater

- Proposed Plan
- Decision Document

Activity ID	Activity Name	Remaining Duration	Start	Finish
	RWP PP & DD @ PBOW	912	26-Jun-08 A	28-Feb-11
A1000	Task Order Award	0		26-Jun-08 A
A1010	Prepare & Submit QCP	1	27-Jun-08 A	31-Aug-08
	Red Water Pond Proposed Plan	175	12-Nov-08	05-May-09
A1270	Prepare & Submit Internal Draft PP	60	12-Nov-08	10-Jan-09
A1280	Review Internal Draft PP	30	11-Jan-09	09-Feb-09
A1290	Prepare & Submit Draft PP	20	10-Feb-09	01-Mar-09
A1360	Review Draft PP	45	02-Mar-09	15-Apr-09
A1370	Prepare & Submit Final PP	20	16-Apr-09	05-May-09
	Red Water Pond Decision Document	240	06-May-09	31-Dec-09
A1300	Prepare & Submit Internal Draft DD	90	06-May-09	03-Aug-09
A1310	Review Internal Draft DD	30	04-Aug-09	02-Sep-09
A1320	Prepare & Submit Draft DD	30	03-Sep-09	02-Oct-09
A1380	Review Draft DD	60	03-Oct-09	01-Dec-09
A1390	Prepare & Submit Final DD	30	02-Dec-09	31-Dec-09



TNT A & C Pilot Study

- Bench-Scale Treatability Study
- Investigate Effectiveness of Alkaline Hydrolysis
- Various alkaline compounds tested
- Various acids tested for neutralization
- Treatment was very effective for TNT; 2,4-DNT; and 2-Amino-2,4-DNT
- Less effective for 2,6-DNT and 4-Amino-2,6-DNT
- Currently neutralizing
- After neutralization will analyze for TCLP

Treatment	pH	TNT		2,6-DNT		2,4-DNT		4Amino-2,6-DNT	2Amino-2,4-DNT
		conc. (mg/kg)	reduction	conc. (mg/kg)	reduction	conc. (mg/kg)	reduction	conc. (mg/kg)	conc. (mg/kg)
After 7-day treatment									
Control	7.80	2575		11441		10733		11	4
Na2CO3	10.60	287	88.85%	6916	39.55%	6193	42.30%	16	10
Na2CO3/Fe	10.60	305	88.16%	8715	23.83%	7834	27.01%	8	3
Portland cement	11.55	21	99.18%	11703	-2.29%	8867	17.39%	8	2
Portland cement/Fe	11.48	67	97.40%	10889	4.82%	9025	15.91%	7	4
NaOH	12.66	5	99.81%	10055	12.11%	344	96.79%	10U	10U
NaOH/Fe	12.62	4	99.84%	7783	31.97%	282	97.37%	4	10U
CaO	12.02	1843	28.43%	9809	14.26%	7512	30.01%	10	10U
CaO/Fe	12.02	3	99.88%	9427	17.60%	8002	25.44%	7	10U
Kiln. Dust	10.91	62	97.59%	10415	8.97%	7860	26.77%	7	3
Kiln. Dust/Fe	10.96	89	96.54%	9601	16.08%	8711	18.84%	7	3
Bed ash	12.00	92	96.43%	10652	6.90%	7911	26.29%	7	10U
Bed ash/Fe	12.00	23	99.11%	9927	13.23%	7710	28.17%	7	10U
After 14-day treatment									
Portland cement	NA	789	69.36%	8446	26.18%	7508	30.05%	12.2	1.5
Portland cement/Fe	NA	48	98.14%	9877	13.67%	7615	29.05%	13.4	2.1
NaOH	NA	1.8	99.93%	11182	2.26%	127	98.82%	6.9	10U
NaOH/Fe	NA	1.9	99.93%	9256	19.10%	67	99.38%	6.9	10U
CaO	NA	11	99.57%	9948	13.05%	8194	23.66%	10.5	3.3
CaO/Fe	NA	2.3	99.91%	9253	19.12%	7486	30.25%	9.8	2.2
Bed ash	NA	72	97.20%	10290	10.06%	7926	26.15%	11	1.4
Bed ash/Fe	NA	2.5	99.90%	11149	2.55%	7935	26.07%	10.9	2
After 28-day treatment									
Control	8.36	2191		9386		9560		8.6	4.9
Portland cement	11.27	103	96.00%	9033	21.05%	7020	34.59%	8.5	5 U
Portland cement/Fe	11.50	1	99.96%	8392	26.65%	6718	37.41%	8.8	5 U
NaOH	11.76	3	99.88%	8452	26.13%	35	99.67%	6.4	5 U
NaOH/Fe	11.89	0.8	99.97%	10667	6.77%	17	99.84%	4.5	5 U
CaO/Fe	12.01	2.5 U	100.00%	9691	15.30%	6702	37.56%	9.2	5 U
Bed ash	11.84	4802*		10085	11.85%	6831	36.36%	11.6	5 U
Bed ash/Fe	11.90	108*		9850	13.91%	6780	36.83%	7	5 U
After 40-day treatment									
Na_2CO_3	10.75	659	74.41%	10005	12.55%	9067	15.52%	5	4
Na_2CO_3/Fe	10.77	408	84.16%	9438	17.51%	8113	24.41%	6	5
Portland cement	NA	16	99.38%	6826	40.34%	5537	48.41%	7	4 U
Portland cement/Fe	NA	2	99.92%	9670	15.48%	6414	40.24%	9	4 U
NaOH	NA	2 U	100.00%	9744	14.83%	35	99.67%	5	4 U
NaOH/Fe	NA	2 U	100.00%	8931	21.94%	12	99.89%	3	4 U
CaO/Fe	NA	11	99.57%	9378	18.03%	6667	37.88%	10	4 U
Bed ash	NA	27	98.95%	10429	8.85%	6390	40.46%	8	4 U
Bed ash/Fe	NA	2 U	100.00%	9851	13.90%	6681	37.75%	10	4 U

Ash Pit 2

- Award this month?
- Site Investigation
  - Soil Borings & Piezometers
  - Wells (sampled Spring & Fall)
- Characterization Report
- BHHRA
- SLERA

Garage Maintenance Area

- Work scoped, proposed, negotiated and awaiting funding for award
- Site Investigation
  - Geophysical Survey
  - Soil Borings & Piezometers
  - Wells (sampled Spring & Fall)
- Characterization Report
- BHHRA
- SLERA

Overview of Plum Brook Ordnance Works

US Army Corps
of Engineers

One Team—Relevant, Ready, Responsive, Reliable

Manufacturing Areas – Decision Documents

US Army Corps of Engineers

TNT Area A

- Draft PP Review: 2 Dec 08 – 4 Feb 09
- Revise PP: 5 Feb 09 – 9 Mar 09
- Public Meeting – 10 Mar 09
- Draft DD Review: 7 May 09 – 9 Jul 09
- Revise DD: 10 Jul – 10 Aug 09
- Final DD – 13 Oct 09

Manufacturing Areas – Decision Documents

US Army Corps of Engineers

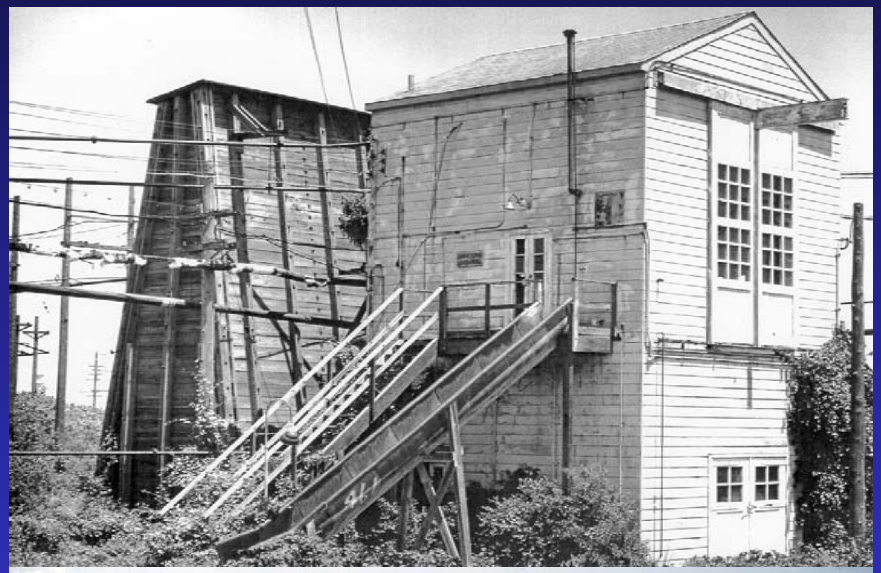
TNT Area B

- Draft PP Review: 22 Jan 09 – 25 Mar 09
- Revise PP: 26 Mar – 24 Apr 09
- Public Meeting – 27 Apr 09
- Draft DD Review: 25 Jun 09 – 27 Jul 09
- Revise DD: 28 Jul 09 – 26 Aug 09
- Final DD – 30 Sep 09

Manufacturing Areas – Decision Documents

US Army Corps of Engineers

TNT Area C



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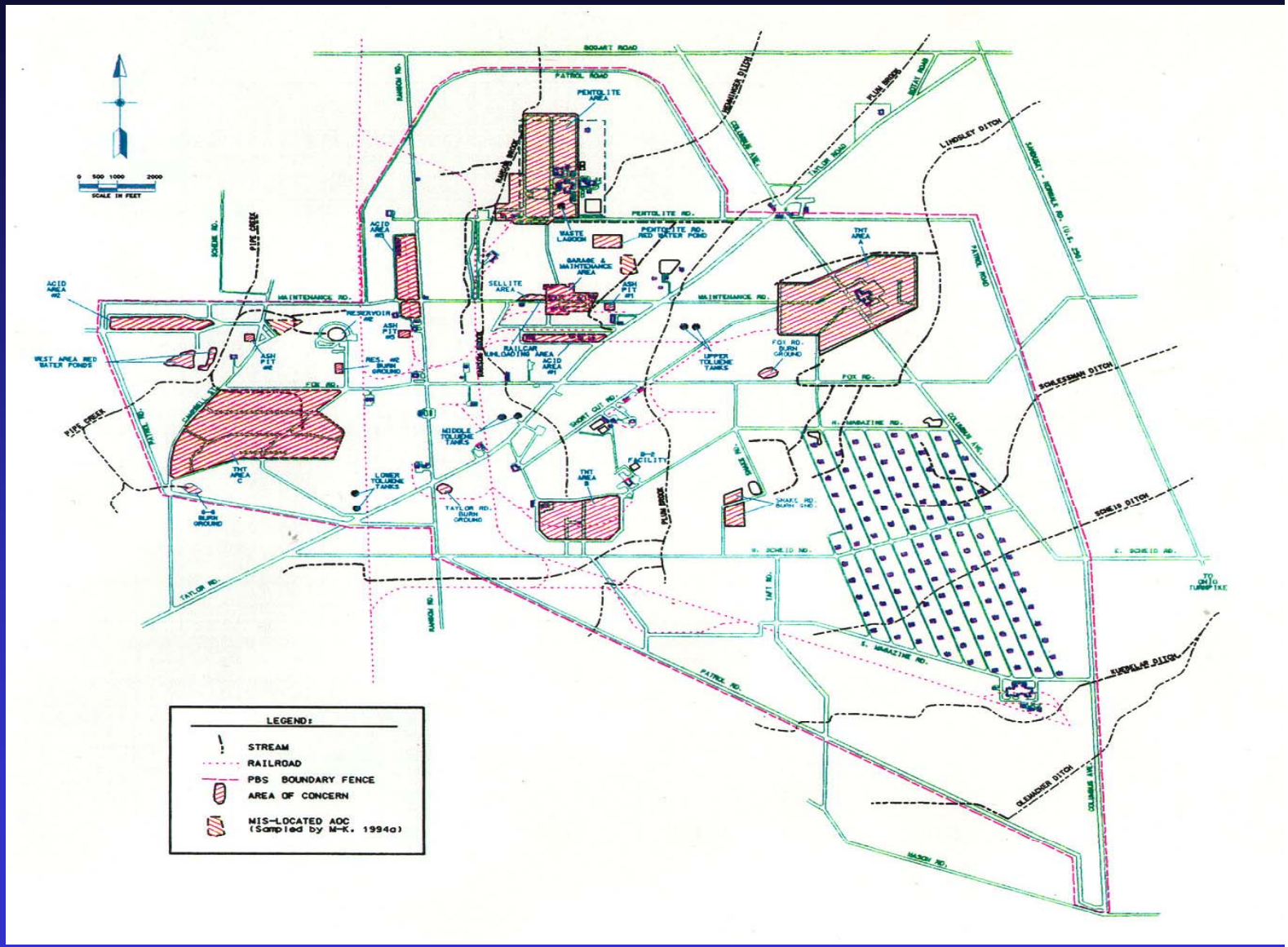
US Army Corps of Engineers

Future Property Use

- **Unrestricted – Residential Use**
- **Restricted – Commercial/Industrial**

Overview of Plum Brook Ordnance Works

US Army Corps of Engineers



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